

Most Frequently Occurring Classifications of Patents Returned
From A Search of 10632598 on September 24, 2004

Original Classifications

4 313/141
3 424/65
2 315/169.3
2 424/59

Cross-Reference Classifications

6 424/401
5 424/400
4 257/E21.703
3 257/E27.111
3 257/E29.273
3 257/E29.275
3 257/E29.295
3 424/68
3 438/29
2 313/118
2 313/143
2 424/60
2 424/66
2 428/336
2 428/694BS
2 435/131
2 435/148
2 435/252.3
2 435/320.1
2 445/1
2 445/7
2 536/23.5

Combined Classifications

6 424/401
5 313/141
5 424/400
4 257/E21.703
3 257/E27.111
3 257/E29.273
3 257/E29.275
3 257/E29.295
3 313/118
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2 424/66
2 428/141
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2 428/336
2 428/694BS
2 435/131
2 435/148
2 435/252.3
2 435/320.1
2 435/69.1
2 438/27
2 445/1
2 536/23.5

10632598

PLUS Search Results for S/N 10632598, Searched September 24, 2004

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present. PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

6113746
6361766
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INDEX **ENGINEERING** ('1MOBILITY, 2MOBILITY, ABI-INFORM, AEROSPACE, ALUMINIUM, ANTE, APOLLIT, BIOENG, BIOTECHNO, CAPLUS, CEABA-VTB, CEN, CIN, CIVILENG, COMPENDEX, CONFSCI, COPPERLIT, CORROSION, DISSABS, DKF, ELCOM, EMA, ENERGY, ENTEC, ENVIROENG, EUROPATFULL, FEDRIP, ...') ENTERED AT 14:39:48 ON 24 SEP 2004

L1 QUE ABB=ON PLU=ON (SP OR SPARK) (W) (SILICON OR SI) OR ((SP OR
SPARK) (A) (SILICON OR SI)) (A) (PROCESS? OR METHOD?)
L2 QUE ABB=ON PLU=ON MEOH OR CH3 OR METHANOL OR VOLATIL? OR GAS
OR GASS? OR GASEUOUS? OR GASI?
L3 QUE ABB=ON PLU=ON L1 AND L2
L4 QUE ABB=ON PLU=ON (HUMMEL, R? OR HUMMEL R?)/AU
L5 QUE ABB=ON PLU=ON (SHEPHERD, N? OR SHEPHERD N?)/AU
L6 QUE ABB=ON PLU=ON L3 NOT (L4 OR L5)

FILE '**HCAPLUS, DISSABS, SCISEARCH, PASCAL**' ENTERED AT 14:52:32 ON 24 SEP 2004

L7 6 SEA ABB=ON PLU=ON L6
L8 6 DUP REM L7 (0 DUPLICATES REMOVED)
L9 **1 SEA ABB=ON PLU=ON L8 AND P/DT**
L10 **5 SEA ABB=ON PLU=ON L8 NOT L9**

L9 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:47881 HCAPLUS Full-text

DN 136:126626

TI Manufacture of original models for optical disks by deep groove (DG) method with higher taper angles of grooves and substrates for high-density optical disks

IN Kato, Keizo; Hosaka, Sumio; Terao, Motoyasu

PA Hitachi Ltd., Japan

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002015474	A2	20020118	JP 2000-192414	20000627

AB The manufacturing method contains (A) depositing a 1st photoresist layer containing no Si on a quartz substrate, (B) hard baking the layer for eliminating photosensitivity, (C) further depositing a 2nd Si-containing photoresist layer, (D) forming patterns of pits and/or grooves by laser photolithog. on the 2nd photoresist layer, (E) transferring the patterns to the 1st photoresist layer by dry etching with O, (F) further transferring the patterns to the quartz layer by dry etching with CF₄, and (G) removing the photoresist layers. The 1st photoresist layer is patterned preferably under conditions where the etching rate of the 1st layer is 10 times higher than that of the 2nd layer. The optical disk substrate is manufactured by preparing a Ni stamper from the original model and injection-molding using the stamper.

IC ICM G11B007-26

ICS G11B007-26

CC 74-12 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST optical disk model quartz deep groove; taper angle DG method silicon photoresist; dry etching high density optical disk; photolithog optical disk model nickel stamper

IT Etching

(dry; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT Models (physical)

Optical disks

Photolithography

Positive photoresists

(manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT Polycarbonates, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(optical disk substrates; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 295343-50-9, F-I-SP

RL: NUU (Other use, unclassified); USES (Uses)

(Si-containing photoresist; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 75-73-0, Tetrafluoromethane 7782-44-7, Oxygen, uses

RL: NUU (Other use, unclassified); USES (Uses)

(etching gas; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 14808-60-7, Quartz, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(model substrate; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 390393-72-3, FHi 610U
RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(photoresist containing no Si, hard-baked; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 7440-21-3, Silicon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(photoresist containing; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

IT 7440-02-0, Nickel, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(stamper; manufacture of original models for high-d. optical disk substrates by deep groove method with higher taper angles of grooves)

L10 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1978:475091 HCAPLUS Full-text
DN 89:75091
ED Entered STN: 12 May 1984
TI Intermolecular interactions in carbon-13 nuclear magnetic resonance. IV.
Van der Waals effects and specific contributions on alkanes and alkenes
AU Cans, Denis; Tiffon, Bernard; Dubois, Jacques Emile
CS Lab. Chim. Org. Phys., Univ. Paris VII, Paris, Fr.
SO Journal of Magnetic Resonance (1969-1992) (1978), 30(1), 1-12
CODEN: JOMRA4; ISSN: 0022-2364
DT Journal
LA English
CC 22-2 (Physical Organic Chemistry)
AB The ^{13}C chemical shifts of a set of polar and nonpolar solutes both in infinite dilute in some magnetically isotropic solvents and in the **gas** phase are interpreted with respect to the continuous medium model based on the reaction field theory. The polar term σE due to the solute permanent dipole moment and computed classically from the solvent dielec. constant is negligible. Thus, exptl. solvent effects are interpreted only in terms of Van der Waals (σW) and sp. (σH) interactions. The behavior of the σW term agrees with the theor. model, and makes it possible to attribute a **sp. Si** parameter to each C. The wide range of Si values cannot be entirely explained in terms of solvent accessibility or charge d. of a given C. The computation of σW allows for the determination of the σH term by simple difference. The linear variation of σH with the INDO π charge d. shows unambiguously the existence of charge-transfer complexes between a double bond and halogenated solvents.
ST carbon NMR alkane alkene; solvent effect Van der Waals
IT Charge-transfer complexes
RL: PRP (Properties)
(between alkenes and halogenated solvents, carbon-13 NMR spectra in relation to)
IT Alkanes, properties
Alkenes, properties
RL: PRP (Properties)
(carbon-13 NMR spectra of, solvent effect on)
IT Nuclear magnetic resonance
(of carbon-13, in alkanes and alkenes, solvent effect on)
IT Force
(Van der Waals, in solvent interaction with alkanes and alkenes, carbon-13 NMR spectra in relation to)
IT 75-35-4, properties 79-29-8 513-35-9 540-84-1 558-37-2 563-46-2
563-78-0 563-79-1 594-56-9 760-21-4 816-79-5 1067-20-5
10557-44-5 10574-37-5
RL: PRP (Properties)
(carbon-13 NMR spectrum of, solvent effect on)

L10 ANSWER 2 OF 5 DISSABS COPYRIGHT (C) 2004 ProQuest Information and Learning Company; All Rights Reserved on STN
AN 95:22529 DISSABS Order Number: AAI9509992
TI PHOTOELECTROCHEMISTRY OF GALLIUM ARSENIDE AND SILICON LIQUID JUNCTIONS (GALLIUM ARSENIDE, SILICON)
AU TAN, MING XIAO [PH.D.]; LEWIS, NATHAN S. [advisor]
CS CALIFORNIA INSTITUTE OF TECHNOLOGY (0037)
SO Dissertation Abstracts International, (1995) Vol. 55, No. 11B, p. 4846. Order No.: AAI9509992. 131 pages.
DT Dissertation

FS DAI
LA English
ED Entered STN: 19950509
Last Updated on STN: 19950509

AB A quantitative study has been performed on the stability of GaAs surfaces in a 0.10 M K_2Se -0.01 M K_2Se aqueous solution. In this electrolyte, n-type GaAs electrodes displayed significant photocorrosion in competition with faradaic charge transfer to Se^{2-} . Chemisorption of group VIIIB metal ions onto the GaAs surfaces yielded improved current-voltage behavior of the GaAs photoanodes, and also resulted in a significant reduction in photocorrosion. This behavior implies that the chemisorbed metal ions act to increase the rate of hole transfer to the Se^{2-} species. Related experiments on n-GaAs, p-GaAs, and Sn-doped In_2O_3 electrodes in $Te^{2-/-}$ aqueous solutions have also been performed. The majority carrier (electrons) transfer rate constant at a highly doped n⁺-Si/Co(Cp) Cl -methanol junction has been measured directly using the chronoamperometry electrochemical technique. The reduction reaction rate of $Co(Cp)_2^{+}$ was 0.03 $cm-s^{-1}$ at the Si electrode, and was more than 100 times slower than at a hanging mercury electrode. The slower rate was attributed to the smaller optical and static dielectric constants, and the lower density of electrons of the semiconductor. The experimental results were compared to the Marcus theory of charge transfer. The unique properties of high purity Si/liquid junctions have been investigated under illumination conditions in which the photogenerated carrier concentration exceeds the dopant concentration. Under these high injection conditions, negligible electric fields exist at the semiconductor/liquid interface, and carrier motion is driven by diffusion. Studies of the current-voltage properties of the Si in methanol solutions containing various redox couples suggested that high efficiency photoelectrochemical cells could be established through selective collection of carriers at the semiconductor/liquid junction. The quasi-Fermi levels of electrons and holes were measured directly against the solution potential. Steady-state and transient photovoltage measurements, and theoretical modeling of the carrier transport, generation, and recombination dynamics indicated that the quasi-Fermi levels were flat across the semiconductor sample. The recombination velocities at the Si/liquid junctions have also been measured, and were shown to vary with the solution potential following the Shockley-Read-Hall theory on recombination.

CC 0488 CHEMISTRY, INORGANIC; 0486 CHEMISTRY, ANALYTICAL

L10 ANSWER 3 OF 5 DISSABS COPYRIGHT (C) 2004 ProQuest Information and Learning Company; All Rights Reserved on STN

AN 93:53385 DISSABS Order Number: AAR0573657 (not available for sale by UMI)

TI STUDIES OF ATOMIC CLUSTERS AND COAL RELATED MATERIAL BY LASER BASED FOURIER TRANSFORM ICR MASS SPECTROMETRY (LASER ABLATION)

AU GREENWOOD, PAUL FRANCIS [PH.D.]

CS UNIVERSITY OF NEW SOUTH WALES (AUSTRALIA) (0423)

SO Dissertation Abstracts International, (1993) Vol. 54, No. 6B, p. 3029. Order No.: AAR0573657 (not available for sale by UMI).

DT Dissertation

FS DAI
LA English
ED Entered STN: 19931119
Last Updated on STN: 19931119

AB Laser ablation Fourier transform mass spectrometry is used to study gas phase ions arising from coals, fullerenes, polycyclic aromatic hydrocarbons, graphite, intricately mixed Si/C powders, Co/P powders and Ni/P powders. The ionic species generated from these samples include molecular and molecular adduct ions as well as atomic clusters. Positive and negative ions of elemental carbon clusters and mixed clusters of silicon carbide, cobalt phosphide and nickel phosphide are investigated. It is shown that the laser fluence as well as the choice of sample influence the ionic cluster distributions produced. Both parameters are varied to gain insights into the formation mechanism of the ionic clusters. For the coal based studies, there is a relationship between the ease of fullerene formation from coals and the degree of polycyclic ring condensation. The production of mixed elemental cluster ions is also shown to depend upon the actual proportion of the elements in the mixed substrates. Attention is directed towards the ionic distributions of carbon clusters. Magic numbered clusters (e.g., C_n^{+} and C_n^{+}) are often dominant in these distributions. Mechanisms of C_n^{+} formation are proposed from the results of this study. Electron attachment is shown to be a prominent pathway for C_n^{-} formation. Formation of C_n^{+} may be initiated by either direct laser desorption from condensed phase molecular C_n substrates or via reactions in the laser plume produced from carbonaceous substrates. Information on the behaviour of coal upon laser ablation is obtained from the examination of polycyclic aromatic hydrocarbons and graphite; these materials being selected to simulate model compounds for different coal classes. Molecular ion information is obtained from the laser desorption of the polycyclic aromatic hydrocarbons as well as from other coal related materials such as pitches, resins and a coal liquefaction catalyst. Tandem MS experiments including collision induced dissociation and ion-molecule reactions are performed on Si_2C^{+} , $Si_2C_2^{+}$, Si_3C^{+} , $Si_3C_2^{+}$, $Si_3C_3^{+}$, SiC_2^{+} , MP_2^{+} and MP_2^{+} , where M = Ni and Co and $n \leq 4$. Characteristic fragmentation pathways and reaction channels are identified. To this end, a differentially pumped triple-pulsed valve inlet system was designed and constructed to allow careful regulation of the operating pressures during such experiments. The many parameters associated with this instrument are characterised and its potential for use in tandem experiments demonstrated.

CC 0486 CHEMISTRY, ANALYTICAL

L10 ANSWER 4 OF 5 SCISEARCH COPYRIGHT (c) 2004 The Thomson Corporation. on
STN

AN 2000:484466 SCISEARCH Full-text

GA The Genuine Article (R) Number: 3270L

TI Exploratory studies on the synthesis of unsymmetrically substituted diacetylenes bearing trialkoxysilyl groups and development of a method for the preparation of 1-lithio-4-(2,8,9-trioxa-5-aza-1-silabicyclo[3.3.3]undecanyl)-1,3-butadiyne: Synthetic and mechanistic aspects

AU Brunel L; Chaplais G; Dutremez S G (Reprint); Guerin C; Henner B J L;
Tomberli V

CS UNIV MONTPELLIER 2, UMR 5637, LAB CHIM MOL & ORG SOLIDE, CASE 007, PL E
BATAILLON, F-34095 MONTPELLIER 5, FRANCE (Reprint); UNIV MONTPELLIER 2,
UMR 5637, LAB CHIM MOL & ORG SOLIDE, F-34095 MONTPELLIER 5, FRANCE

CYA FRANCE

SO ORGANOMETALLICS, (26 JUN 2000) Vol. 19, No. 13, pp. 2516-2525.
Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036.

ISSN: 0276-7333.
DT Article; Journal
FS PHYS
LA English
REC Reference Count: 71

AB (Z)-CH₃OCH=CHC=CSi(OCH₃)(3)(2), ((Z)-CH₃OCH=CHC=C)(2)Si(OCH₃)(2)(5), and (Z)-CH₃-OCH=CHC=CSi(OCH(CH₃)(2))(3)(16) have been synthesized from (Z)-CH₃OCH=CHC=CH(1). Enynes 2 and 16 were subjected to a deprotonation-elimination-deprotonation sequence with 2 equiv of lithium diisopropylamide (LDA) in THF and the expected intermediates (RO)(3)SiC=CC=CLi (R = CH₃, CH(CH₃)(2)) allowed to react with R'₃SiCl (R' = CH₃, C₆H₅) to produce the unsymmetrical butadiynes (RO)(3)SiC=CC=CSiR'(3). Symmetrical butadiynes of the type R'₃SiC=CC=CSiR'(3) were obtained instead of the expected unsymmetrical ones due to cleavage of the C-sp-Si(OR)(3) bond by CH₃OLi formed in situ. Cleavage of the latter bond can be avoided by using a silatrane moiety in place of the trialkoxysilyl group. Thus, (CH₃)(3)-SiC=CC=CSi(OCH₂CH₂)(3)N (26a) and (C₆H₅)(3)SiC=CC=CSi(OCH₂CH₂)(3)N (26b) were obtained in 61% and 45% yield, respectively, upon subjecting (Z)-CH₃OCH=CHC=CSi(OCN₂-CH₂)(3)N (20) to a deprotonation-elimination-metalation sequence with 2 equiv of LDA followed by quenching of the intermediate lithium compound LiC=CC=CSi(OCH₂CH₂)(3)N (25) with (CH₃)(3)SiCl and (C₆H₅)(3)SiCl. The deprotonation-elimination-metalation sequence applied to 20 is best carried out in pyridine, and the role of pyridine in this reaction is discussed.

CC CHEMISTRY, INORGANIC & NUCLEAR; CHEMISTRY, ORGANIC
STP KeyWords Plus (R): PENTACOORDINATE SILICON-COMPOUNDS; VERSATILE SYNTHON; CARBON; POLYMERIZATION; MULTILAYERS; SILATRANES; PRECURSORS; POLYINES; PYRIDINE; POLYMERS

L10 ANSWER 5 OF 5 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN
AN 1999-0381253 PASCAL Full-text
CP Copyright .COPYRG. 1999 INIST-CNRS. All rights reserved.
TIEN Study and realisation of the structures based on porous silicon for **gas** detection
TIFR Etude et realisation de structures a base de silicium poreux en vue de la detection de gaz
AU POLISCHUK Vladimir; SOUTEYRAND Eliane (dir.)
CS Ecole centrale de Lyon, Ecully, France (tutelle)
SO (1999-03), 90 refs.
122 p.
Dissertation Information: Ecole centrale de Lyon. Ecully. FRA, Th. doct., 99ECDL0016
DT Dissertation
BL Monographic
CY France
LA French
SL French; English
AV INIST-T 125359, T99ECDL0016 0000; RBCCN-690812301, T99ECDL0016 0000
ABFR Ce travail de these visait a etudier les potentialites du silicium poreux comme support d'un element sensible pour les capteurs de gaz. Afin de comprendre les mecanismes de formation du silicium poreux nous avons eu recours a l'electrochimie fondamentale de silicium. Ainsi, les mesures I-V de l'interface silicium/solution d'acide fluorhydrique ont mis en evidence deux mecanismes competitifs : la formation electrochimique de l'oxyde de silicium et sa dissolution par HF. De meme, la nature de l'oxyde de silicium est discutee dans le cadre des diagrammes d'equilibres tension-pH du systeme silicium-eau. Dans le but de developper de nouveaux capteurs de gaz, nous avons elabore des couches de

silicium poreux modifiees ulterieurement par un metal catalytique. Dans le cas des structures de type diode (Pd/**SP/Si**), l'epaisseur de la couche de silicium poreux controle les processus de transport de courant. La quantite du palladium deposee influe beaucoup sur la sensibilite des structures sous gaz. Ainsi, ce sont les structures avec une couche ultramince de palladium qui presentent les meilleures reponses a l'hydrogene. En s'appuyant sur le modele d'une heterojonction Metal/Silicium Poreux/Si ayant une couche mince de silicium poreux, nous avons relie ce phenomene a la variation des porteurs libres de la zone de charge d'espace du silicium. La mesure de la difference de potentiel de contact nous a permis d'etudier l'effet de l'adsorption d'hydrogene sur la surface de palladium supporte sur du silicium poreux. Malgre nos attentes, les structures a base du silicium poreux ont montre une faible amelioration de la sensibilite par rapport aux structures traditionnelles Pd/SiO₂/Si. Par contre, elles etaient plus performantes en ce qui concerne la cinetique, donc le temps de reponse deux fois plus rapide.

CC 001B00G07D; Physics; Metrology

001C04A; Chemistry; Analytical chemistry

PAC 0707D

CT Experimental study; Chemical sensors; **Gas** detector; Silicon;
Porous materials; Modified material; Ultrathin films; Palladium;
Potential difference; Contact potential; Sensitivity; Response time;
Schottky barrier diodes; Hydrogen

File 2: **INSPEC 1969-2004/Sep W2**
 (c) 2004 Institution of Electrical Engineers

File 6: **NTIS 1964-2004/Sep W3**
 (c) 2004 NTIS, Intl Cpyrght All Rights Res

File 8: **Ei Compendex(R) 1970-2004/Sep W2**
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File 25: **Weldasearch 1966-2003/Dec**
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File 34: **SciSearch(R) Cited Ref Sci 1990-2004/Sep W2**
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File 434: **SciSearch(R) Cited Ref Sci 1974-1989/Dec**
 (c) 1998 Inst for Sci Info

File 35: **Dissertation Abs Online 1861-2004/Aug**
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File 94: **JICST-EPlus 1985-2004/Aug W4**
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 (c) 2004 The HW Wilson Co.

File 103: **Energy SciTec 1974-2004/Aug B2**
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File 144: **Pascal 1973-2004/Sep W2**
 (c) 2004 INIST/CNRS

File 239: **Mathsci 1940-2004/Nov**
 (c) 2004 American Mathematical Society

File 241: **Elec. Power DB 1972-1999Jan**
 (c) 1999 Electric Power Research Inst.Inc

File 305: **Analytical Abstracts 1980-2004/Sep W3**
 (c) 2004 Royal Soc Chemistry

File 315: **ChemEng & Biotec Abs 1970-2004/Aug**
 (c) 2004 DECHEMA

File 987: **TULSA (Petroleum Abs) 1965-2004/Sep W4**
 (c) 2004 The University of Tulsa

Set	Items	Description
Set	Items	Description
S1	1254	AU=(HUMMEL, R? OR HUMMEL R?)
S2	553	AU=(SHEPHERD, N? OR SHEPHERD N?)
S3	21	S1 AND S2
S4	5	RD (unique items)
S1	2116	(SP OR SPARK) (2W) (SILICON OR SI)
S2	535605	MEOH OR CI=CH3 OR CH3 OR METHANOL OR VOLATIL?
S3	1	CC=(A7860F AND A8270R)
S4	72	S1 AND S2
S5	1	S1 AND S2 AND S3
S6	12287	CC=(A7860F OR A8270R)
S7	1	S6 AND S4
S8	277	(SP OR SPARK) (W) (SILICON OR SI) OR (SP OR SPARK) (W) PROCESS? (W) (SILICON OR SI)
S9	7	S2 AND S8
S10	6	S9 NOT S5
S11	2	S10 NOT PY>2002
S12	4	S10 NOT S11
S13	3217635	GAS OR GASS? OR GASEUOUS? OR GASI?
S14	10	S13 AND S8 NOT S9
S15	10	S14 NOT PY>2002 (none other than applicants in S4)

4/9/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC
(c) 2004 Institution of Electrical Engineers. All rts. reserv.

7724787 INSPEC Abstract Number: A2003-20-7860F-002
Title: Improved electroluminescence of spark-processed silicon by an aerosol-assisted technique
Author(s): **Shepherd, N.; Hummel, R.E.**
Author Affiliation: Dept. of Mater. Sci. & Eng., Florida Univ., Gainesville, FL, USA
Journal: Physica Status Solidi A vol.197, no.1 p.222-7
Publisher: Wiley-VCH,
Publication Date: May 2003 Country of Publication: Germany
CODEN: PSSABA ISSN: 0031-8965
SICI: 0031-8965(200305)197:1L.222:IESP;1-H
Material Identity Number: P159-2003-007
U.S. Copyright Clearance Center Code: 0031-8965/03/19705-0222\$17.50+.50/0
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: The electroluminescence (EL) intensity (radiant flux) of spark-processed (sp) Si has been improved by one order of magnitude by introducing into the spark plasma an intimately mixed methanol/silicon particle suspension. This results in a smoother surface and an increased contact area to the semitransparent silver layer. As a consequence the light emitting region is substantially enhanced. Further, the device current increases by aerosol-assisted spark processing compared to conventional sp techniques. The EL spectra of sp-Si display maxima near 750 nm (1.7 eV) and 660 nm (1.9 eV) and a threshold wavelength for light emission at about 360 nm (3.2 eV). A mechanism for sp-induced EL of Si is proposed. (6 Refs)
Subfile: A
Descriptors: aerosols; electroluminescence; elemental semiconductors; silicon; suspensions
Identifiers: electroluminescence; spark processed silicon; aerosol-assisted technique; electroluminescence intensity; spark plasma; mixed methanol/silicon particle suspension; surface; contact area; semitransparent silver layer; light emitting region; device current; aerosol assisted spark processing; conventional sp techniques; EL spectra; sp-Si display maxima; threshold wavelength; sp-induced EL; 750 nm; 660 nm; 360 nm; Si
Class Codes: A7860F (Electroluminescence (condensed matter)); A8270R (Aerosols and foams); A8270K (Emulsions and suspensions)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Numerical Indexing: wavelength 7.5E-07 m; wavelength 6.6E-07 m; wavelength 3.6E-07 m
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4/9/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC
(c) 2004 Institution of Electrical Engineers. All rts. reserv.

7640679 INSPEC Abstract Number: A2003-13-7860F-005, B2003-07-4220-003
Title: A model for the electroluminescence of spark-processed Si
Author(s): **Shepherd, N.; Hummel, R.E.**
Author Affiliation: Dept. of Mater. Sci. & Eng., Florida Univ.,

Gainesville, FL, USA

Journal: Journal of the Physics and Chemistry of Solids vol.64, no.6
p.967-74

Publisher: Elsevier,

Publication Date: June 2003 Country of Publication: UK

CODEN: JPCSAW ISSN: 0022-3697

SICI: 0022-3697(200306)64:6L:967:MESP;1-2

Material Identity Number: J091-2003-004

U.S. Copyright Clearance Center Code: 0022-3697/03/\$30.00

Document Number: S0022-3697(02)00456-0

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P); Experimental (X)

Abstract: We have fabricated electroluminescent (EL) devices from spark-processed Si (sp-Si) using n and p-type silicon. Visible light emission with peaks at around 650 and 730 nm was obtained from devices fabricated using Ag, Au and Al as semitransparent contacts through which the light is emitted. EL is observed under the condition of electron injection into the sp-Si layer for both n and p-type silicon. These devices displayed quasi-rectifying current-voltage (I-V) characteristics. Devices fabricated using indium-tin-oxide (ITO) as the semitransparent contact displayed ohmic device characteristics and no light emission was observed. A study of the dependence of the threshold voltage for EL (and EL intensity) on wafer resistivity for n-type Si did not reveal a behavior consistent with carrier inversion, necessary if an injection mechanism were responsible for the luminescence. Absorption peaks were measured in the same spectral range as the emission peaks, and the changes in EL intensity with pre-metallization annealing temperature correlated with the changes of defect concentrations with annealing temperature in sp-Si. It is proposed that electrons generated by impact ionization relax to the ground state via luminescing centers present in sp-silicon resulting in the observed light emission. The dependence of the reverse bias current on temperature for sp-Si EL devices was found to be consistent with impact ionization. (29 Refs)

Subfile: A B

Descriptors: aluminium; annealing; charge injection; electrical resistivity; electroluminescence; electroluminescent devices; elemental semiconductors; gold; impact ionisation; indium compounds; ohmic contacts; semiconductor-metal boundaries; silicon; silver; tin compounds

Identifiers: electroluminescence; spark-processed Si; electroluminescent devices; EL; ITO; n-type silicon; p-type silicon; visible light emission; semitransparent contacts; electron injection; quasirectifying current-voltage characteristics; indium-tin-oxide; ohmic device characteristics; threshold voltage; wafer resistivity; carrier inversion; premetallization annealing temperature; defect concentrations; impact ionization; ground state; luminescing centers; 650 nm; 730 nm; Au; Ag; Al; Si; In/sub 2-x/Sn/sub x/O/sub 3-y/

Class Codes: A7860F (Electroluminescence (condensed matter)); A7865H (Optical properties of elemental semiconductors (thin films/low-dimensional structures)); A7360J (Electrical properties of elemental semiconductors (thin films/low-dimensional structures)); A7340N (Electrical properties of metal-nonmetal contacts); A7220H (High-field transport and nonlinear effects (semiconductors/insulators)); A6170A (Annealing processes); A8140G (Other heat and thermomechanical treatments); A8140T (Optical properties (related to treatment conditions)); B4220 (Luminescent materials); B4260 (Electroluminescent devices); B2550A (Annealing processes in semiconductor technology); B2530D (Semiconductor-metal interfaces); B2520C (Elemental semiconductors)

Chemical Indexing:

Au int - Au el (Elements - 1)

Ag int - Ag el (Elements - 1)

Al int - Al el (Elements - 1)

Si int - Si el (Elements - 1)

InSnO int - In int - Sn int - O int - InSnO ss - In ss - Sn ss - O ss
(Elements - 3)

Numerical Indexing: wavelength 6.5E-07 m; wavelength 7.3E-07 m

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4/9/3 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

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7107689 INSPEC Abstract Number: A2002-02-7855-002

Title: Interpretation of photoluminescence spectra obtained for spark-processed Si

Author(s): Hummel, R.E.; Shepherd, N.; Burton, D.

Author Affiliation: Dept. of Mater. Sci. & Eng., Florida Univ., Gainesville, FL, USA

Journal: Applied Physics Letters vol.79, no.20 p.3218-20

Publisher: AIP,

Publication Date: 12 Nov. 2001 Country of Publication: USA

CODEN: APPLAB ISSN: 0003-6951

SICI: 0003-6951(20011112)79:20L:3218:IPSO;1-8

Material Identity Number: A135-2001-046

U.S. Copyright Clearance Center Code: 0003-6951/2001/79(20)/3218(3)/\$18.0

0

Document Number: S0003-6951(01)02646-8

Language: English Document Type: Journal Paper (JP)

Treatment: Experimental (X)

Abstract: Absorption spectra obtained from spark-processed Si (sp-Si) utilizing differential reflectometry yield a series of closely spaced energy levels, as expected for amorphous materials, which reside between 1.7 and 2.8 eV. Further, a broad absorption band is observed between about 3.2 and about 6.2 eV. A HeCd laser pumps electrons from the ground state into this absorption band. The blue and green photoluminescence peaks of sp-Si are interpreted as originating from emission energy levels at 3.22 and 2.36 eV into which the electrons revert from the just mentioned absorption band by nonradiative transitions. In contrast, pumping with an argon ion laser provides only enough energy to excite the electrons from the ground state into the above mentioned, closely spaced, lower absorption bands and thus causes only a 1.9 eV (red) radiation. (8 Refs)

Subfile: A

Descriptors: amorphous semiconductors; electronic structure; elemental semiconductors; optical pumping; photoluminescence; plasma materials processing; reflectivity; silicon; spark machining; visible spectra

Identifiers: spark-processed Si; photoluminescence spectra; absorption spectra; differential reflectometry; closely spaced energy levels; amorphous materials; broad absorption band; HeCd laser pumping; ground state; blue photoluminescence peaks; green photoluminescence peaks; emission energy levels; nonradiative transitions; Ar ion laser pumping; 1.7 to 2.8 eV; 3.5 to 6 eV; Si

Class Codes: A7855C (Photoluminescence in elemental semiconductors); A7840E (Visible and ultraviolet spectra of elemental semiconductors); A7125M (Electronic structure of amorphous and glassy solids); A5275R (

Plasma applications in manufacturing and materials processing)

Chemical Indexing:

Si el (Elements - 1)

Numerical Indexing: electron volt energy 1.7E+00 to 2.8E+00 eV; electron volt energy 3.5E+00 to 6.0E+00 eV

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4/9/4 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

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6046147 INSPEC Abstract Number: A9822-7855-021, B9811-4220-005

Title: Does the fast, blue photoluminescence from spark-processed silicon originate from tungsten doping?

Author(s): Hummel, R.E.; Shepherd, N.; Ludwig, M.H.; Stora, M.E.

Author Affiliation: Dept. of Mater. Sci. & Eng., Florida Univ., Gainesville, FL, USA

Journal: Thin Solid Films vol.325, no.1-2 p.1-3

Publisher: Elsevier,

Publication Date: 18 July 1998 Country of Publication: Switzerland

CODEN: THSFAP ISSN: 0040-6090

SICI: 0040-6090(19980718)325:1/2L1:DFBP;1-T

Material Identity Number: T070-98018

U.S. Copyright Clearance Center Code: 0040-6090/98/\$19.00

Document Number: S0040-6090(98)00426-X

Language: English Document Type: Journal Paper (JP)

Treatment: Experimental (X)

Abstract: It has recently been stated in the literature that the fast, blue photoluminescence which emanates from spark-processed silicon upon laser irradiation originates from tungsten contaminants which have been inadvertently introduced into the silicon substrate when Si is spark-processed by utilizing a tungsten counter electrode. We present four pieces of experimental evidence which argue against this suggestion. An alternative interpretation is presented. (7 Refs)

Subfile: A B

Descriptors: elemental semiconductors; excited states; impurity distribution; laser beam effects; photoluminescence; semiconductor growth; silicon; sparks; tungsten

Identifiers: spark-processed silicon; blue photoluminescence; laser irradiation; tungsten contaminants; elemental semiconductors; semiconductor growth; 350 to 650 nm; Si; Si:W

Class Codes: A7855D (Photoluminescence in tetrahedrally bonded nonmetals); A6170W (Impurity concentration, distribution, and gradients); A6180B (Ultraviolet, visible and infrared radiation effects); A8110 (Methods of crystal growth and purification); B4220 (Luminescent materials); B2520C (Elemental semiconductors); B0510 (Crystal growth)

Chemical Indexing:

Si el (Elements - 1)

Si:W bin - Si bin - W bin - Si el - W el - W dop (Elements - 1,1,2)

Numerical Indexing: wavelength 3.5E-07 to 6.5E-07 m

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4/9/5 (Item 1 from file: 8)

DIALOG(R)File 8:Ei Compendex(R)

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05483504 E.I. No: EIP00025037816

Title: Electroluminescence and magnetic field quenching of photoluminescence of spark-processed Si

Author: Hummel, R.E.; Stora, M.E.; Shepherd, N.; Yu, S.; Fajardo, F.

Corporate Source: Univ of Florida, Gainesville, FL, USA

Conference Title: Proceedings of the 1998 1st International Conference on Porous Semiconductors - Science and Technology (PSST-98)

Conference Location: Mallorca, Spain Conference Date: 19980316-19980320

E.I. Conference No.: 56339

Source: Journal of Porous Materials v 7 n 1 2000. p 131-134

Publication Year: 2000

CODEN: JPMAFX ISSN: 1380-2224

Language: English

Document Type: JA; (Journal Article) Treatment: X; (Experimental)

Journal Announcement: 0004W1

Abstract: Light emitting, spark-processed silicon (sp-Si) is a captivating material whose physical properties have not yet been fully investigated and understood. This paper presents some new, but preliminary, observations. Firstly, we found that magnetic fields influence the photoluminescence intensity of UV/blue luminescing sp-Si. Specifically, magnetic field cycles (from positive to negative field strengths) reduce the PL light intensity by about 6%. Secondly, an electroluminescing device, based on sp-Si, which emits in the green spectral range, is described and its emission spectrum is shown. Thirdly, the PL spectrum of laser-processed silicon is presented. It is shown that laser-processed silicon and UV/blue emitting sp-Si display identical PL spectra. (Author abstract) 8 Refs.

Descriptors: *Silicon; Electroluminescence; Photoluminescence; Magneto-optical effects; Luminescent devices; Emission spectroscopy; Laser applications

Identifiers: Spark processing

Classification Codes:

549.3 (Others, including Bismuth, Boron, Cadmium, Cobalt, Mercury, Niobium, Selenium, Silicon, Tellurium & Zirconium); 701.1 (Electricity: Basic Concepts & Phenomena); 741.1 (Light/Optics); 701.2 (Magnetism: Basic Concepts & Phenomena); 741.3 (Optical Devices & Systems)

549 (Nonferrous Metals & Alloys); 701 (Electricity & Magnetism); 741 (Optics & Optical Devices)

54 (METAL GROUPS); 70 (ELECTRICAL ENGINEERING); 74 (OPTICAL TECHNOLOGY)